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Subject Installation Specifications for Interim Capping - Asarco East Hel ena Plant

Per your request, I have attached below the installation specifications - RPE Geomembrane for the interim capping at the Asarco East Helena Plant. These specifications were pulled from the May 2006 Phase 2 and 3 bid package. As was discussed during our meeting yesterday, please recognize that the described capping project specifications are designed to be "interim" and not a permanent remedy. The attached interim capping project is being implemented to address potential source control until the final, site-wide cap is installed. Asarco is in the process of designing a permanent cap for the entire East Helena facility. Our objective is to complete the design and proceed in a phased construction approach by installing the permanent cap components as we complete the various demolition projects throughout the facility. Since the completion of the Phase 1, 2, and 3 demolition projects outpaced the timing for the final cap design, the Phase 1, 2, and 3 areas will need to be integrated into the final cap design, at a later date. Asarco and our contractors are rapidly moving forward with the planning for the Phase 2 and 3 demolition. As such, any comments you may have on the interim capping project must be received as soon a possible so that we can maintain our very tight schedule. Finally, any major deviation from the prescribed specifications may also alter our agreement with our contractor. I look forward to hearing from you.

Jon Nickel
Environmental Manager
Asarco East Helena Plant

Installation Specification -RPE® Geomembrane

PART 1 - GENERAL

1.1 Scope

A. The work covered by this specification consists of the supply (and installation) of an RPE geomembrane at the locations shown on the drawings (as directed by the Engineer).

B. The supply (and installation) of this liner shall be in accordance with the following references:

1. ASTM D751-89, Standard Test Methods for Coated Fabrics.
2. ASTM D3020-89, Standard Specification for Polyethylene and Ethylene Copolymer Plastic Sheeting for Pond, Canal, an Reservoir Lining.
3. ASTM D4545-86(91), Standard Practice for Determining the Integrity of Factory Seams Used in Joining Manufactured Flexible Sheet

Geomembranes.

PART 2 - PRODUCTS

2.1 Material Characteristics

A. The sheeting shall be suitably formulated from first quality polyethylene materials. The geomembrane shall consist of a high strength, oriented-tape HDPE scrim coated on both sides with an impervious LDPE coating (HDPE coating for OR RPE 25). RPE materials prepared for temporary covers or other exposed application will have UV stabilizers added to the impervious coating (and may have UV stabilizers added to the scrim tapes). The RPE material shall be pigmented to produce a uniform color such as black, blue, or silver. Unpigmented materials may be used for applications that are backfilled.

B. The sheeting shall be capable of being sealed to itself using heat-sealing techniques.

C. The sheeting shall be supplied in the widest widths possible to minimize fabrication seaming. Roll widths shall be not less than 3.5 m.

2.2 Manufacturer's Statement

A. Upon request, the manufacturer of the RPE sheeting shall submit a certification that the material meets the manufacturer's specifications. Material index quality control tests shall be performed a minimum of every 18,000 kg (40,000 lbs), once per shift, or at the start of a new material run.

2.3 material Properties

A. The geomembrane shall be OR RPE 25 as supplied by Layfield Plastics
or an approved equal. The geomembrane shall conform to the manufacturer's material properties table. All values are Typical Values unless otherwise noted.

PART 3 - EXECUTION

3.1 Fabrication

A. On all projects larger than 20,000 m2 (200,000 ft2), submit a panel
layout in accordance with the project submittal requirements. On the panel layout, indicate the proposed arrangement of panels, fabricated seam orientation, field seam location, and anchor trench locations.

B. Individual roll widths of RPE shall be fabricated into large panels
to minimize field seaming. All fabrication welds shall be a minimum of 25 mm (1 inch) wide. Heat welding techniques shall be used for shop fabrication such that all shop welds will provide a delamination of the coating from the scrim when tested. Peel testing will meet the requirements for a "Film Tear Bond" (FTB) Peel Adhesion. The minimum FTB rating shall be AD-DEL.

C. Fabrication welding shall be tested for Bonded Seam strength at a rate of three samples for every 915 lineal meters (3,000 ft) of welded seam. At the fabricator's option, one sample may be taken from each 300 lineal meters (1,000 ft) of welded seam or every 5 shop seams (whichever is greater). Seam samples will be tested for shear strength. Fabricated seam strengths shall conform to the shop seam strength values. Seams samples shall also be qualitatively tested for peel adhesion with a Film Tear Bond

rating being obtained on all seams. Seams that do not meet the strength or FTB criteria are to be repaired and retested.

D. Fabricated panels shall be accordion folded in one direction and neatly rolled in the other. Each panel shall be protected with an opaque, weather resistant covering and marked with panel dimensions and unfolding directions. All panels shall be delivered and stored in a protected area until ready for installation.

3.2 Installation

A. Prepared surfaces shall be smooth and free of sharp objects, rocks, and organics (roots). If a suitable subgrade is not available then 100 mm (4 inches) of clean sand, and a 10 ounce geotextile shall be placed prior to liner installation (subject to site conditions). A 10 ounce geotextile shall be placed under the liner in all areas.

B. Installation shall be performed in a logical sequence by an installer/contractor experienced in lining installations.

C. Place panels according to the drawings and the panel layout. Sufficient thermal slack shall be incorporated during placement to ensure that harmful stresses do not occur in service. Distribute slack wrinkles evenly.

D. All field seams shall be tightly bonded using tape seaming technology. Six inch wide polyisobutylene-butyl sealant tape shall be used at penetrations and for all field seams.

E. Full contact between the tape and the material will be the standard of acceptance.

F. All field seams shall be non-destructively tested along their entire length using the Air Lance Test (ASTM D4545) or the Mechanical Point Stress Test (ASTM D4545). Patches and seams around pipe penetrations and fitments shall be tested using the Point Stress Test (ASTM D4545). All discontinuities detected by any test method shall be repaired.

G. Repairs shall utilize the same material as the geomembrane, or a material compatible with the geomembrane, and shall extend a minimum of 300 mm (12 inches) beyond the defect. Repairs shall be accomplished with tape seaming techniques utilizing a tape appropriate to existing site conditions. All repairs are to be tested using Air Lance or Mechanical Point Stress methods as applicable (ASTM D4545).

H. Protect the geomembrane from wind uplift during installation through the use of sand bags or other suitable weights. Backfill anchor trenches and place design backfill on geomembrane as soon as practical. Placement of backfill should be monitored continuously, and any damaged areas repaired and tested.

I. Shingle RPE seams in the direction of water flow as applicable. If possible, backfill in the direction of flow to prevent application of stresses to field seams.

END OF SECTION

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